

CLAIMS

What is claimed is:

- 5 1. A method of eliciting an immune response in a vertebrate subject, said method comprising administering a first vaccine composition comprising a nucleic acid molecule encoding a selected antigen to a fetal vertebrate subject *in utero*, mucosally via the amniotic fluid, under conditions that permit the expression of said antigen, thereby eliciting an immunological response to said antigen.
- 10 2. The method of claim 1, wherein said nucleic acid molecule is included in a recombinant vector.
- 15 3. The method of claim 2, wherein the administering is nonviral-mediated delivery.
- 20 4. The method of claim 1, wherein said vertebrate subject is a mammal.
5. The method of claim 1, wherein said antigen is a viral antigen.
- 25 6. The method of claim 5, wherein said viral antigen is a herpesvirus antigen.
7. The method of claim 1, wherein said administering is done orally.
8. The method of claim 1, wherein said administering is done in the third trimester.
- 30 9. The method of claim 1, further comprising administering a second vaccine composition to the vertebrate subject at birth to boost the immune response to the antigen encoded by the nucleic acid molecule in the first vaccine composition.

10. The method of claim 9, wherein the second vaccine composition comprises the nucleic acid molecule present in the first vaccine composition.

11. The method of claim 9, wherein the second vaccine composition is a subunit 5 vaccine composition that comprises the antigen encoded by the nucleic acid molecule present in the first vaccine composition.

12. A method of eliciting an immune response in a vertebrate subject, said 10 method comprising administering a first vaccine composition comprising a recombinant vector encoding a selected antigen to a fetal vertebrate subject *in utero*, orally, via the amniotic fluid, under conditions that permit the expression of said antigen, thereby eliciting an immunological response to said antigen, wherein the administering is nonviral-mediated delivery.

15 13. The method of claim 12, wherein said viral antigen is a herpesvirus antigen.

14. The method of claim 12, wherein said delivery is done in the third trimester.

15. The method of claim 12, further comprising administering a second vaccine 20 composition to the vertebrate subject at birth to boost the immune response to the antigen encoded by the recombinant vector in the first vaccine composition.

16. The method of claim 15, wherein the second vaccine composition comprises the recombinant vector present in the first vaccine composition.

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17. The method of claim 15, wherein the second vaccine composition is a subunit vaccine composition that comprises the antigen encoded by the recombinant vector present in the first vaccine composition.

30 18. A method of eliciting an immune response in a mammalian subject, said method comprising:

(a) administering a first vaccine composition comprising a recombinant vector encoding a selected viral antigen to a fetal mammalian subject *in utero* during the third trimester, orally via the amniotic fluid, under conditions that permit the expression of said antigen and elicit an immunological response to said antigen; and

5 (b) administering a second vaccine composition to the mammalian subject at birth to boost the immune response to the antigen encoded by the recombinant vector in the first vaccine composition.

19. The method of claim 18, wherein the second vaccine composition comprises
10 the recombinant vector present in the first vaccine composition.

20. The method of claim 18, wherein the second vaccine composition is a subunit
vaccine composition that comprises the antigen encoded by the recombinant vector
present in the first vaccine composition.

15 21. The method of claim 18, wherein the administering in step (a) is nonviral-
mediated delivery.

20 22. The method of claim 18, wherein the administering in step (b) is nonviral-
mediated delivery.

23. The method of claim 18, wherein the administering in step (a) and step (b) is
nonviral-mediated delivery.

25 24. A method of delivering a recombinant vector encoding a selected antigen to a
fetal vertebrate subject *in utero* to elicit an immune response, said method comprising
administering said recombinant vector orally via the amniotic fluid to said fetus, under
conditions that permit the expression of said antigen, thereby eliciting an immunological
response to said antigen.

30 25. The method of claim 24, wherein said vertebrate subject is a mammal.